No. 787,310. PATENTED APR. 11, 1905.

C. SCHWEIZER.

STOVE.

APPLICATION FILED MAR. 28, 1901.

Fig. 1.

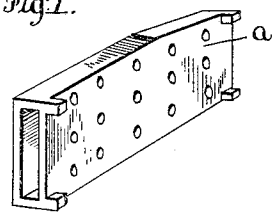


Fig. 2.

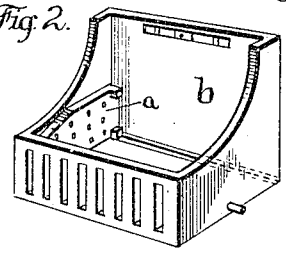


Fig. 3.

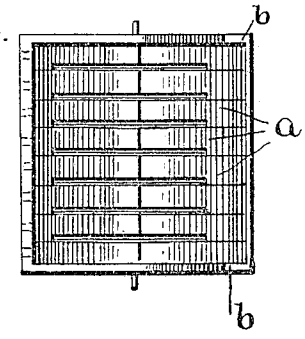


Fig. 4.

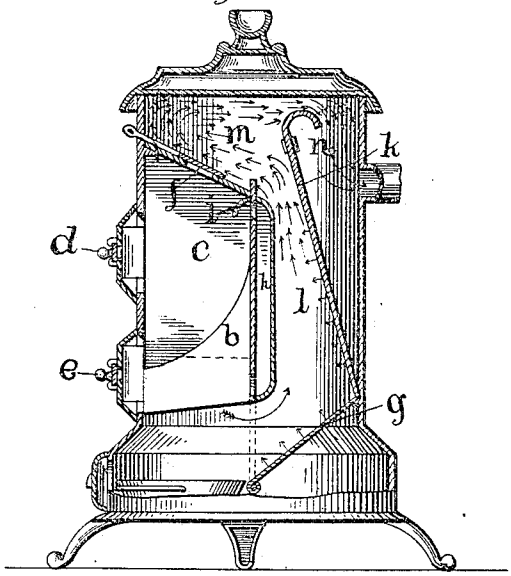


Fig. 5.

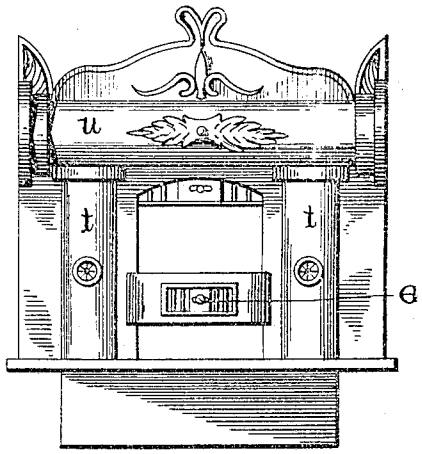


Fig. 6.

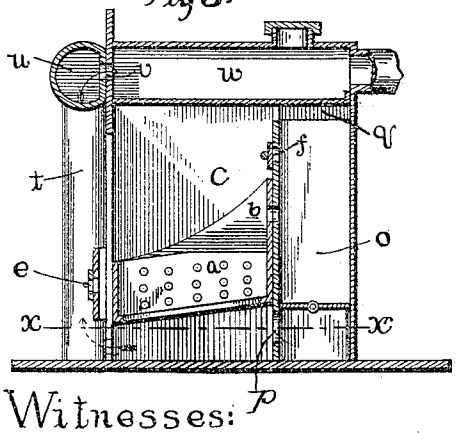
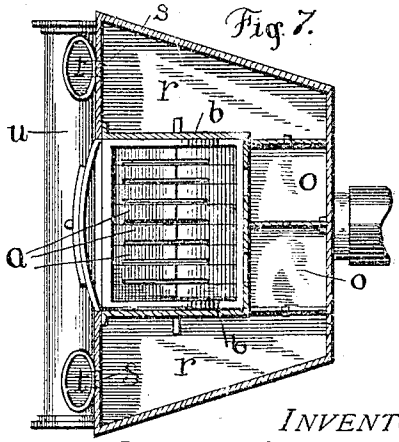


Fig. 7.



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by R. S. & A. Tyler, Jr.,

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No. 787,310. Patented April 11, 1905.

UNITED STATES PATENT OFFICE.

CHARLES SCHWEIZER, OF MAPLEWOOD, MASSACHUSETTS, ASSIGNOR TO AMERICAN HEATING CO., OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

STOVE.

SPECIFICATION forming part of Letters Patent No. 787,310, dated April 11, 1905.

Application filed March 28, 1901. Serial No. 53,233.

To all whom it may concern:

Be it known that I, CHARLES SCHWEIZER, a citizen of the United States, residing at Maplewood, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Stoves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists in a stove which will effect complete combustion of fuel, including the inflammable products of combustion, and in which the resulting heat is utilized to the fullest possible extent before any escape, thus getting a maximum of heat and of heating with a minimum of fuel, all substantially as hereinafter described and claimed.

In the accompanying drawings, illustrating some of many possible forms of embodiment of my invention, Figure 1 is a view in perspective, showing my particular grate-bar. Fig. 2 is a similar view showing a grate-box, casing, holder, or frame with a grate-bar in position. Fig. 3 is a view in plan, showing the box with all the grate-bars in place, the whole constituting the grate. Fig. 4 is a view, mostly in central vertical longitudinal section, exhibiting embodiment of my invention in a closed stove. Fig. 5 is a view in front elevation, showing an open-front stove, commonly called a "grate" or an "open grate," embodying features of my invention. Fig. 6 is a view in central vertical longitudinal section, exhibiting embodiments of my invention in an open-front stove; and Fig. 7 is a view in horizontal section, taken on line x x of Fig. 6 looking upward.

In the drawings, a indicates a hollow open-ended laterally-perforated grate-bar of refractory substance provided on one or both sides at its ends with offsets and preferably formed with a straight bottom and a hipped or double-inclined top for best effect toward combustion and shedding, as in turtle-back firing of a locomotive.

The grate-bars are set into and suitably held in an iron or other desirable casing or frame b, which has vertical slits in its front, may have a slide-controlled exit at the upper part of its back to be opened if the stove should "smoke," as from putting on too much fuel at a time, and has pintles at its sides, so that it may be rocked when in place, the open front end of each grate-bar registering with a slit, all as shown in Fig. 2, and the offsets on the grate-bars, when these are assembled, leaving draft-spaces between the bars, communicating laterally with the hollows or chambers—that is, the interiors of the bars—by the perforations in these grate-bars and casing constituting the grate.

The grate is set into a combustion-chamber c, which may be in a closed stove, as shown in Fig. 4, or in an open-front stove, commonly called an "open grate" or a "grate," as shown in Figs. 5, 6, and 7. In the burning of the fuel the grate-bars become highly heated, whereby, chiefly under downdraft, inflammable gases from the fuel coming into contact with their outer and inner surfaces are ignited, while under updraft the heated bars cause hot air to be supplied to the fuel, greatly promoting combustion, making it more complete. While my preference is for a downdraft, yet the combustion-chamber is so provided that either a downdraft or an updraft may be employed and the fire may be started with an updraft. In the closed stove, Fig. 4, there is a slide-controlled opening d in the fuel-door corresponding with the free opening of the open-front stove, Figs. 5, 6, and 7, a slide-controlled opening e at the grate-bars corresponding with a like one in the open-front stove, and a slide-controlled opening f at the top of the combustion-chamber corresponding with a like opening at the upper part of the back of the combustion-chamber of the open-front stove. With d open and e and f closed draft is downward through the grate-bars. With e and f open draft is into the hollow grate-bars, out through the perforations into the draft-spaces, and upward between the bars. To control the air-exit below the grate, an adjustable damper g may be provided, which in open position is at right angles to the path of

the products of combustion. The open stove may have a similar provision. The combustion-chamber in either embodiment shown may have at its back a regenerator *h*, opening into it above and below, a hood *i* within the combustion-chamber over the opening above serving to lead into the regenerator carbon monoxid and light products of combustion not carried into the grate-bars by the downdraft.

Having obtained complete combustion and a maximum of heat, it is essential to utilize the heat to best advantage and get a maximum of heating from it, and to this end I convey the products of combustion by tortuous passage through the stove, greatly increasing the heating-surface and imparting to it for radiation into the apartment substantially all the heat of the products of combustion before their escape. In the closed stove there is behind the combustion-chamber a forward-inclined partition *k*, extending across from one side of the stove to the other in front of and masking the exit-flue and extending upward to near the top of the stove, leaving a small passage, the partition, completed to a deflector by the valve *g* when open, forming with the back of the combustion-chamber a chamber *l*, having a choke-opening leading into a chamber *m*, the small passage above leading from the chamber *m* into a chamber *n*, communicating directly with the exit-flue. The partition acts by its inclination and with the choke to project the products of combustion to the front of the stove and also by radiation to throw heat to the front away from the exit, while its extension to near the top, leaving the small passage, forms another choke, by which the products of combustion are longer kept in contact with the stove and its upper portion is heated, neither choke, of course, being so great as to prevent adequate draft. In the open stove a centrally-partitioned chamber *o*, corresponding to chamber *l*, is entered from the grate in downdraft by passages *p* below and communicates by openings *q* at its sides above with chambers *r*, corresponding to chamber *m*, these chambers *r* communicating by passages *s* below with vertical flues *t*, which open into a cross-flue *u*, whence passage *v* leads to a top flue *w*, from which leads out an exit-flue above if the stove is to be set into a fireplace or at the rear if it is to be set in an apartment. The chambers *r* and their extensions correspond to the chamber *n*.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A combustion-chamber containing a grate and provided with an air-entrance above the grate and an air-exit below it, and also with an air-entrance at the grate and an air-exit above it, means constructed to control the air-exit below the grate and arranged to be adjusted, in open position, at an angle to the path of the products of combustion, and means constructed to control the other several air-entrances and exits, whereby the combustion-chamber may act by downdraft, or by updraft, as desired, substantially as described.

2. The combination with the combustion-chamber having a provision for both down and up draft, of the damper, *g*, constructed to be adjusted, in open position, at an angle to the path of the products of combustion, and to, in closed position, interrupt the downdraft, substantially as described.

3. A stove having a combustion-chamber containing a grate with lateral spaces between the grate-bars, a draft-opening and a smoke-discharge opening, and means for withdrawing unconsumed inflammable gases and returning the same to the spaces between the grate-bars in mixture with freshly-supplied air, substantially as described.

4. A stove having a combustion-chamber, a grate having hollow grate-bars with lateral openings, a draft-opening and discharge-opening, and means for withdrawing unconsumed inflammable gases and feeding the same to the hollow grate-bars and thence again within the zone of combustion, substantially as described.

5. A stove provided with a combustion-chamber, a grate having hollow grate-bars with lateral openings, air-supply openings and smoke-escape openings, a hood within the combustion-chamber for withdrawing unconsumed inflammable gases and leading the same to the hollow grate-bars and thence within the zone of combustion, substantially as described.

6. A stove having a combustion-chamber and a grate, a draft-opening above the grate and an escape-opening below the grate, a hood within the combustion-chamber so disposed as to withdraw the combustible gases and return the same to the zone of combustion, a compartment to the rear of the combustion-chamber into which the escape-opening permits the products of combustion to enter, a vertically-sloping partition within the compartment causing the products of combustion to pass upward and then downward to the flue-opening, substantially as described.

7. The combination, in a stove, of the forward-inclined partition *k* and the damper *g*, constructed to be adjusted, in open position, at an angle to the path of the products of combustion and to said partition *k*, substantially as shown.

8. The combination of the forward-inclined partition, *k*, and the damper, *g*, with the combustion-chamber, forming the chamber, *l*, substantially as shown and described.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

CHARLES SCHWEIZER.

Witnesses:
ALEXANDER B. WILSON,
CALVIN S. CARTER.